Potential of National Industry in supporting NPP development

Presented at:
INPRO Dialogue Forum on Sustainable Supply Chains for Advanced Nuclear Power Systems
IAEA Headquarters, Vienna, Austria 2–4 July 2018

Suparman
Centre for Nuclear Energy System
National Nuclear Energy Agency of Indonesia (BATAN)
Introduction – Prospect of Nuclear Energy

Indonesia is a nation with growing population, now about 261 million people, growing economy, and consequently growing needs for energy. At present, Indonesia still relies heavily on fossil fuels as a primary component in both its energy and power mix.

The target of installed capacity in 2025 is 135 GW meanwhile until 2017 installed capacity only 60 GW

The progress of 35 GW program (2015-2019) by the end of November 2017 is 1061 MW (3%) COD
Target of Installed Capacity

![Graph showing the target of installed capacity over time.](chart.png)
Criteria for Nuclear Energy

Based on the National Energy General Plan, nuclear can be utilized with some criteria such as:

- For fulfilling the needs of growing energy demand by supplying national energy in a large scale
- Reducing carbon emissions
- Economic competitiveness (NPP electricity selling price $\leq\ 7.66$ cent/kWh - the Amount of Cost of Generation Provision as basis for Power Purchase Agreement)
## STUDY OF NATIONAL PARTICIPATION

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>NPP</th>
<th>Unit 1&amp;2</th>
<th>Unit 3&amp;4</th>
<th>Unit 5&amp;6</th>
<th>Unit 7&amp;8</th>
<th>Unit 9&amp;10</th>
</tr>
</thead>
<tbody>
<tr>
<td>NewJec</td>
<td>1994</td>
<td>PWR</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>60</td>
<td>Optimum</td>
</tr>
<tr>
<td>MHI-WH</td>
<td>1996</td>
<td>AP600</td>
<td>31</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>GE</td>
<td>1996</td>
<td>ABWR</td>
<td>26,1</td>
<td>31,4</td>
<td>37,5</td>
<td>60</td>
<td>Optimum</td>
</tr>
<tr>
<td>KEPCO</td>
<td>1997</td>
<td>KSNP1000</td>
<td>25</td>
<td>40</td>
<td>60</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>UGM</td>
<td>2004</td>
<td>OPR1000</td>
<td>25</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>KHNP</td>
<td>2006</td>
<td>OPR1000</td>
<td>20</td>
<td>50</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RENUKO</td>
<td>2014</td>
<td>HTGR 3 MW</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: around 75% is civil work
Selecting Local Industry

Criteria:
• Experiences: has experience in constructing of conventional power plant or chemical plant
• Production capacity
• Code and Standard
• Human resources
• Investment/capital

National Company could support for Nuclear Power Plant Development Program:
• Have many experiences as Main EPC Contractor for Coal Fired Steam Power Plant with capacity < 300 MW
• Have experiences in collaborating with Foreign EPC Contractor in large capacity ≥ 600 MW
### National EPC Company Involvement

**INVolvement National EPC Company In EPC Stage**

<table>
<thead>
<tr>
<th>No</th>
<th>Scope</th>
<th>Basic Design</th>
<th>Detail Design</th>
<th>Procurement</th>
<th>Construction</th>
<th>Commissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NSSS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Major</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Turbine Island</td>
<td>Major</td>
<td>Minor</td>
<td>Major</td>
<td>Major</td>
<td>Minor</td>
</tr>
<tr>
<td>3</td>
<td>Balance of Plant</td>
<td>Major</td>
<td>Minor</td>
<td>Minor</td>
<td>Major</td>
<td>Minor</td>
</tr>
<tr>
<td>4</td>
<td>Substation &amp; Transmission Line</td>
<td>Major</td>
<td>Minor</td>
<td>Minor</td>
<td>Major</td>
<td>Minor</td>
</tr>
<tr>
<td>5</td>
<td>Civil Work</td>
<td>Major</td>
<td>Minor</td>
<td>Minor</td>
<td>Major</td>
<td>Minor</td>
</tr>
</tbody>
</table>

- National EPC Company could support for civil work of NSSS and Turbine island scope in collaboration with International EPC Company
- For the NPP project with capacity < 300 MW, BOP, Substation/trms. and Turbine Island scope will be major involvement by National EPC company excl. commissioning work
Supply Chain of Civil Work

NPP Construction

Civil Construction

Civil Construction Industries

Steel Structure Industries

Steel Industries

Cement Industry

Supporting Material Industries
Supply Chain of Civil Work

PT. Adhi Karya
- Experiences:
  - Port of Inalum
  - Bride of Suramadu
  - Tn. Abang Market
  - Istiqlal Mousque
  - etc

PT. Waskita Karya
- Experiences:
  - Lahendong Geothermal PP
  - Muara Karang CPP
  - Port
  - Research Reactor Serpong
  - Port and dam

PT. Hutama Karya
- Experiences:
  - Segara Mini Hydro
  - Cirompang Mini Hidro
  - Kendari CPP
  - Ampana CPP
  - Port
  - Building

PT. Pembangunan Perumahan
- Experiences:
  - KDL CCPP 3x40
  - GPP 90MW
  - Talang Duku GPP 65 MW
  - Port and Dam
  - Building

PT. Krakatau Engineering
- Experiences:
  - EPO GPP 2x40 Gunung Megang
  - Sumatra Selatan
  - WHRG Power Plant 2 x 14 MW
  - PT. Meratus jaya
  - Urea dan Amonia Plant

PT. Total Bangun Persada
- Experiences:
  - Building
  - Hotel & Office
  - Apartment
  - Etc.
Supply Chain of Civil Work

Civil Construction Industries

Steel and Steel Structure

PT. Krakatau Steel
- Experiences:
  - Build PT Krakatau Daya Listrik (Power Plant)

PT. Gunung Steel Group
- Experiences:
  - Supply the project of PT. Krakatau Engineering
  - Supply the project of PT. Krakatau Posco

PT. Cilegon Fabrication
- Experiences:
  - Suralaya CPP
  - Bukit Asam CPP
  - Belawan CPP
  - PLTGU Cilegon, Muara Karang dan Tg. Periok

PT. Ometraco Arya Samanta
- Experiences:
  - CCPP Tambal Lorok project, Semarang
  - Paison-Besuki CPP
  - Gresik CPP
  - Petero Kimia Gresik
  - Kamojang, Jabar
Supply Chain of Civil Work

Civil Construction Industries

Cement

PT. Semen Padang
- Experiences:
  - Waste heat recovery power generation at Indarung
  - CPP construction at teluk sirih

PT. Semen Baturaja Palembang
- Experiences:
  - No information to build electrical generation plant

PT. Semen Holchim Indonesia
- Experiences:
  - Cilacap CPP(2006)
  - Paiton CPP
  - Labuan CPP
  - Indramayu CPP
  - Muara Tawar CPP

PT. Semen Gresik
- Experiences:
  - Sudimoro CPP Pacitan
  - Paiton CPP Probolinggo
  - Sluke CPP Rembang
Conclusion

- Potential Industries has been identified based on criteria to participate in the construction of new nuclear power plant.
- National companies have many experiences as Main EPC Contractor for Coal Fired Steam Power Plant with capacity < 300 MW.
- National EPC Company could support for civil work of NSSS and Turbine island scope in collaboration with International EPC Company.
- Supply chain, especially on civil work, has been identified to ensure sustainability of supply.
Thank you